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# BUTLER'S GARTER SNAKE.

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[From the University Museum, University of Michigan.]

The garter snake, *Eutænia butleri* Cope, has been the subject of considerable discussion among herpetologists in spite of the fact that only five specimens were known. In 1888, Professor Cope ('89, p. 399) first recognized and described the species on the basis of a single specimen (Purdue Univ. Catalogue, No. 264) sent to him by Mr. A. W. Butler. This specimen was thought to have come from Richmond, Indiana, but it was unlabeled when Mr. Butler received it from Purdue University, so it may or may not have come from there. In 1895, Mr. Reddick ('96, p. 261) took another specimen (Univ. of Ind. Cat. No. 110) at the Indiana University Biological Station at Turkey Lake, Kosciusko County, Indiana. There are two specimens in the museum of the Academy of Natural Sciences of Philadelphia (Cat. No. 6523) labeled by Professor Cope, which are described by Mr. A. E. Brown ('01, p. 27) and credited by him to southeastern Indiana. But in a letter April 15, 1904, he says concerning these specimens, "The locality given is Miami river, which probably means Ohio." The fifth specimen recorded (U. S. N. M. Cat. No. 21692) was collected by Mr. Philip Kirsch at Waterloo, Indiana, and is described by Dr. Stejneger ('94, pp. 593–594).

Professor Cope examined the type and on the basis of its distinctive characters considered it a good species, a view supported by Dr. Stejneger after a study of the specimen from Waterloo, Indiana. Mr. Brown, however, upon a study of the two specimens in the collection of the Philadelphia Academy of Natural Sciences, and for the reason that there were so few specimens known, considered them anomalies of *E. sirtalis sirtalis*, with considerable reason, for it seems as if four specimens (the specimen from Turkey Lake is described for the first time in this paper) is entirely too small a number upon which to form a species. Particularly is this true in a genus like *Eutænia*, in which

the individual variation is so great. It was, therefore, with considerable interest that I found last winter, while working over the collection of reptiles in the University Museum at the University of Michigan, a number of specimens of this rare snake. I have been able to make a study of the character of these specimens, and to supplement this by a study of the coloration and, to a certain extent, of the habits of a number of living specimens which have been collected about Ann Arbor. The present paper embodies the results of this investigation, and the data on all the other specimens recorded.

Through the courtesy of Dr. W. J. Moenkhaus, the specimen taken at Turkey Lake, Ind., has been examined, and Dr. Stejneger has very kindly sent me a detailed description of the specimen from Waterloo, Ind. I am indebted to Mr. A. E. Brown for a description of the specimens in the Museum of the Academy of Natural Sciences of Philadelphia, who also examined two specimens from Ann Arbor, Mich., and pronounced them the same form as those in his possession. I wish also at this time to acknowledge my indebtedness to Mr. Chas. C. Adams, Curator of the University Museum, University of Michigan, for assistance in the prosecution of this work and in the publication of the results.

I have been unable to examine the type, which according to Professor Cope is Cat. No. 264 at Purdue University. The specimen sent to me as the type is Cat. No. 81, and while labeled *E. butleri*, is not that form, but a normal specimen of *E. sirtalis sirtalis*, and corresponds in no way to Professor Cope's description of the type. I have also, through the kindness of Professor S. Coulter, examined the garter snakes in the Butler collection at Purdue University, but found no specimens of *butleri* among them.

It is important to diagnose this form, as it is very probable that many specimens are at present stored in museums under other names or undetermined. In this connection, one calls to mind a paper by Dr. H. L. Clark of Olivet College, Olivet, Michigan, on the occurrence of the short mouthed snake in Michigan ('03, pp. 83–88). Last year Dr. Clark found six specimens of a snake, which upon the authority of Mr. S. Garmen and Dr. Stejneger,

he called *E. brachystoma* Cope. I have, through the courtesy of Dr. Clark, examined three of these specimens and we both agree that they are the same form as those which I identified as *E. butleri*. The only specimen of *E. brachystoma* ever recorded is in the collection of the Philadelphia Academy of Natural Sciences and Mr. Brown says of this specimen that, "There is little ground for thinking it other than a dwarfed *E. sirtalis sirtalis*." ('01, p. 28). After a comparison with specimens of *E. butleri* from here, Mr. Brown writes me as follows, "I have reëxamined the type of *E. brachystoma* Cope, and still find no reason to believe it other than an anomalous *E. sirtalis sirtalis*. Cope says 'it is small but not young,' I myself see no way to determine this, it may or may not be so. The specimen was about ready to shed when he got it, which of course obscured the pattern. I cannot think it is the same as *E. butleri*."

Dr. Stejneger suggested ('94, p. 594) that the specimen collected near Chicago in 1874, by Mr. E. W. Nelson, and labeled by Davis and Rice *E. vagrans* ('83, p. 30), might prove to be another specimen of *butleri*, but through the courtesy of Dr. U. S. Grant, Curator of the Museum at Northwestern University, I have been able to examine this specimen, and it is undoubtedly an *E. vagrans*. It differs from *butleri* most noticeably in having the dorsal scales in 21 rows, 8 supralabials on the right side and 9 on the left, and in the larger number of urosteges and gastrosteges, which are respectively 86 and 170.

## Habits.

Very little has been recorded on the habits of this snake. Its movements as Mr. Reddick describes them, are extremely awkward. It seems compelled to exert much effort in crawling, and its efforts to escape capture are often ludicrous. In captivity it takes readily to water, and is an exceedingly graceful swimmer. Its awkwardness in crawling, contrasted with its ease of motion in water, together with the fact that all the specimens recorded have been taken near water, bears out the statement of Dr. Clark ('03, p. 87) that "Although not aquatic this species likes water and is found only in its immediate vicinity." It is one of the first Michigan snakes to come out in the spring; a

single specimen having been taken as early as March 18, which is the earliest date recorded for any snake from this locality. The latest date at which a specimen has been taken is September 22, but the time of hibernation is undoubtedly much later than this. It is an exceedingly amiable little snake, and no amount of rough handling will induce it to strike, which is in marked contrast to the pugnacity of *E. sirtalis sirtalis*, when captured. As far as I have been able to observe, its diet in captivity consists chiefly of earthworms and small frogs. Its breeding habits are unknown; in one specimen (U. of M. Mus. Cat., No. 31612) taken May 28, 1904, at Sandusky, Ohio, there are 8 eggs in each oviduct about 20 mm. long and 12 mm. broad. In another specimen (U. of M. Mus. Cat., No. 31624) taken June 3, 1904, at Ann Arbor, Michigan, there are 7 eggs in the right and 5 in the left oviduct. These eggs are about 12 mm. long and 10 mm. broad.

## Distribution.

The geographical range of *butleri*, as we know it, is very limited. As will be seen from the table, it occurs in the northern and, if the locality of the type is correct, the southeastern parts of Indiana, in the north and southwestern parts of Ohio and in southern Michigan. It apparently cannot be abundant in Indiana or more specimens would have been taken, as many reptiles have been collected there and the state has been worked by Dr. O. P. Hay, who describes ('92, p. 528) the type as being the only specimen known at that time. In southern Michigan, however, it occurs quite commonly, at least near Ann Arbor. Of its occurrence in other parts of Michigan, nothing can be said, except of the six specimens taken by Dr. Clark at Olivet.

## Diagnosis.

Body stout, tapering abruptly at both ends. Head conical, smaller than neck, muzzle a little protuberant. Tail short. Dorsal scales in 19 rows, all carinated, the first much the largest. Supralabials 6–6, the fifth the largest, the third and fourth, entering the orbit. Infralabials 8–8. Preoculars 1–1. Postoculars 3–3. Temporals 1–1, the second large, extending from labials to parietals. Gastrosteges 140. Urosteges 61. Length

230 mm. Tail 60 mm. Color above olive brown, with two alternate rows of black spots above the lateral stripe, and one below; the dorsal spots forming a broken border to the dorsal stripe. Color below light olivaceous, sparsely speckled with black, with a row of gastrostegeal spots on either side. The dorsal stripe occupies the median and the two half rows of scales on either side; anteriorly bright yellow, it extends well up between the parietals; posteriorly it fades out quickly to a greenish yellow, and loses its distinctness on the tail. Color below the lateral stripe the same as above, olive brown. Lateral stripes anteriorly bright sulphur yellow, broad, occupying all of the third, the upper half of the second and the lower half of the fourth rows of dorsal scales on the anterior half of the body. On the posterior half they occupy exclusively the second and third rows to the vent; but they never descend below the middle of the second row; at the vent they widen out to cover part of the first, all of the second and third, and all of the fourth rows; posteriorly to the vent, olive in color, occupying but one row of scales, the first, and becoming more and more indistinct toward the end of the tail.

FIG. 1. Eutænia butleri Cope. Ann Arbor, Washtenaw Co., Michigan, Cat. No. 30460, U. of M. Museum.

Anteriorly the lateral stripe expands to form a large yellow patch on either side of the neck, in which occur two black spots one on the right side, and one on the left. These spots are continuations of the row below the lateral stripe. There is also a black spot, just above the sixth supralabial, that is prolonged in front to the lower edge of the upper postocular. Above the black line formed by the continuation of this spot, the head is uniformly brownish olive, with the exception of a black patch on the parietals in which are located the prominent bright yellow parietal spots. The supralabials are dusky yellow, narrowly margined with black; the yellow extending up to the black line, thus including the two lower postoculars, and part of the first temporal. In front of the eye, the yellow of the supralabials extends onto the preocular, where it gradually fades into the olive-brown of the top of the head. The eye is surrounded by a nar-

row ring of black; as is also the nostril. There is also a black line between the preocular and loreal. Chin white. Throat yellowish.

The specimen upon which I have based the above description as being typical of the form, since I have been unable to examine the type, is a specimen taken on the bank of the Huron river, near Ann Arbor, Michigan, by myself, September 22, 1903 (U. of M. Mus. Cat. No. 30642). It is not a mature specimen, and for this reason the color pattern is more distinct than in older specimens, for the ground color tends to become darker and to obscure the spots in adults. This is the only difference except in size to be observed between old and young specimens.

## Variation.

Contrary to the usual tendency among the species of *Eutænia*, the specimens of *butleri*, which I have examined, show but little individual variation from the type as described by Cope, or the specimen which I have chosen as being most nearly normal. It is an interesting coincidence, that all the specimens previously recorded (Phila. Acad. of Sci. Cat. No. 6523, U. S. N. M. Cat. No. 21692, and Purdue Univ. Cat. No. (type) 264), possess 7 supralabials on either side, while in the specimens which I have examined these are nearly always 6–6, but occasionally 6–7 and in three cases 7–7; when there are 6 supralabials, the fifth is always the largest; when there are 7, the extra one is apparently formed by a divison of the fifth, as may be seen in two cases (U. of M. Mus. Cat. No. 30683 and 30506), in which the fifth is only partially divided. The supralabials are nearly always 8–8; in two cases (U. of M. Mus. Cat. No. 30471–30407*a*) they are 9–9, and in one case the extra one is on one side only. The oculars are normally 1–3, with an occasional variation to 1–2. Concerning the disputed second temporal, there is in most cases a single large temporal in the second row, as is given by Prof. Cope for the type. When there are two, the upper is always very much the smaller, and generally so much so as to be surrounded by the lower on the lower and posterior sides. In specimen No. 6523b Phila. Acad. of Sciences, the lower one of the second row seems to have divided length-

wise so as to form a long narrow scale which is in contact with the first temporal. The gastrosteges vary in number in 20 specimens from 131–154 with an average of 139; the urosteges in 19 specimens from 50–71 with an average of 60. The coloration is remarkably constant, the only differences observed being the presence of lighter ground color in the young which causes the lateral spots to stand out more prominently than in the older specimens, where the color varies to a brownish black, which may quite obscure the spots.

For convenience, the data on the specimens previously described and on fifteen specimens which I have examined have been tabulated on following pages. It will be seen from this table that there is, as was shown above, some individual variation, yet the distinctive characters are so pronounced and constant, that in the case of none of the thirty specimens examined was I in doubt as to where to place a single individual.

## Affinities of Butleri.

Professor Cope's statement, that *E. butleri* "is remarkably distinct from anything which occurs in the United States" is born out by the specimens now at hand. As was mentioned above, the range of variation is never great enough to make the determination of a specimen doubtful. They resemble in this region the *E. sirtalis* group more closely than any other, and it was for this reason that Mr. Brown considered his specimens aberrant forms of *sirtalis sirtalis*. The finding of so many specimens, however, makes this view untenable, and the question then arises, whether it is to be considered as a variety of *E. sirtalis*, or as a distinct species.

The number of gastrosteges, and superior and inferior labials are normally less than in any *E. sirtalis* except *E. s. leptocephala*. The gastrosteges in one instance are 154, a common number in *sirtalis sirtalis*, and the supralabials are sometimes seven, the normal number for *sirtalis sirtalis* which also occasionally has nine infralabials, as occurs in two specimens of *butleri*. It might seem from this, as Mr. Brown has suggested to me, that *butleri* bears the same relation to *E. s. sirtalis* as *E. s. leptocephala* does. He regards *E. s. leptocephala* as a degenerate form of *E. s. sirtalis*,

| Specimens. | Locality and Date. | Supra-labials. | Infra-labials. | Oculars. | Tem porals. | Uro-steges. | Gastro-steges | Total Length. | Length of Tail. | Collector. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Purdue Univ., Cat. No. 264. (Type.) | Richmond, Wayne Co., Indiana. (?) | 7 | 8 | 1–3 | 1–1 | 62 | 144 | | | |
| 2. U. S. N. M., Cat. No. 21692. | Waterloo, Steuben Co., Indiana, July 17, 1893. | R 7<br>L 7 | R 8<br>L 9 | R 1–3<br>L 1–2 | R 1–2<br>L 1–2 | 57 | 131 | 530mm | 115mm | Philip Kirsch. |
| 3. Univ. of Ind., Cat. No. 110. | Turkey Lake, Kosciusko Co., Indiana. | R 6<br>L 7 | R 8<br>L 8 | R 1–3<br>L 1–3 | R 1–2<br>L 1–1 | 60 | 134 | | | G. Reddick. |
| 4. Philadelphia Acad. of Nat. Sci., Cat. No. 6523*a*. | Miami River, Ohio. (?) | R 7<br>L 7 | R 8<br>L 8 | R 1–3<br>L 1–3 | R 1–2<br>L 1–2 | 71 | 144 | 475mm | 107mm | |
| 5. Philadelphia Acad. of Nat. Sci., Cat. No. 6523*b*. | Miami River, Ohio. (?) | R 7<br>L 7 | R 8<br>L 8 | R 1–3<br>L 1–3 | R 1–2<br>L 1–2 | 68 | 142 | 440mm | 112mm | |
| 6. Univ. of Mich., Cat. No. 30642. | Ann Arbor, Washtenaw Co , Mich., Sept. 22, 1903. | R 6<br>L 6 | R 8<br>L 8 | R 1–3<br>L 1–3 | R 1–1<br>L 1–1 | 61 | 140 | 230mm | 60mm | Riley & Ruthven. |
| 7. Univ. of Mich., Cat. No. 30641. | Ann Arbor, Washtenaw Co., Mich., Sept. 22, 1903. | R 6<br>L 6 | R 8<br>L 8 | R 1–3<br>L 1–3 | R 1–1<br>L 1–1 | 57 | 136 | 220mm | 50mm | Riley & Ruthven. |
| 8. Univ. of Mich., Cat. No. 30863. | Chelsea, Washtenaw Co., Mich., Oct. 28, 1903. | R 7<br>L 7 | R 8<br>L 8 | R 1–3<br>L 1–3 | ?<br>? | 62 | 138 | 240mm | 55mm | E. N. Transeau. |
| 9. Univ. of Mich., Cat. No. 30460. | Ann Arbor, Washtenaw Co., Mich., April 28, 1903. | R 6<br>L 6 | R 8<br>L 8 | R 1–2<br>L 1–3 | R 1–1<br>L 1–1 | 50 | 154 | 415mm | 90mm | N. A. Wood. |
| 10. Univ. of Mich., Cat. No. 30506. | Chelsea, Washtenaw Co., Mich., May 10, 1903. | R 6<br>L 6 | R 8<br>L 8 | R 1–3<br>L 1–3 | R 1–2<br>L 1–2 | 58 | 135 | 450mm | 110mm | Chas. C. Adams. |
| 11. Univ. of Mich., Cat. No. 30109. | Ann Arbor, Washtenaw Co., Mich., March 18, 1903. | R 6<br>L 6 | R 8<br>L 8 | R 1–2<br>L 1–2 | R 1–1<br>L 1–1 | 54 | 140 | 480mm | 105mm | N. A. Wood. |
| 12. Univ. of Mich., Cat. No. 30471. | Ann Arbor, Washtenaw Co., Mich., May 2, 1903. | R 6<br>L 6 | R 9<br>L 9 | R 1–3<br>L 1–3 | R 1–1<br>L 1–2 | 55 | 140 | 415mm | 90mm | Chas. C. Adams. |
| 13. Univ. of Mich., Cat. No. 30407*a*. | Ann Arbor, Washtenaw Co., Mich., April 7, 1900. | R 6<br>L 6 | R 9<br>L 9 | R 1–3<br>L 1–3 | R 1–1<br>L 1–1 | Tail broken | 137 | | | Ida M. Hopson. |

| Specimens. | Locality and Date. | Supra-labials. | Infra-labials. | Oculars. | Tem-porals. | Uro-steges. | Gastro-steges. | Total Length. | Length of Tail. | Collector. |
|---|---|---|---|---|---|---|---|---|---|---|
| 14. Univ. of Mich., Cat. No. 30407*b*. | Ann Arbor, Washtenaw Co., Mich., April 7, 1900. | R 6<br>L 6 | R 8<br>L 8 | R 1–3<br>L 1–3 | R 1–2<br>L 1–2 | 67 | 139 | 406mm | 106mm | Ida M. Hopson. |
| 15. Univ. of Mich., Cat. No. 31383. | Ann Arbor, Washtenaw Co., Mich., April 27, 1901. | R 6<br>L 7 | R 8<br>L 8 | R 1–2<br>L 1–2 | R 1–1<br>L 1–2 | 61 | 141 | | | Florence J. Hagle. |
| 16. Univ. of Mich., Cat. No. 31613. | Sandusky, Erie Co., Ohio, May 28, 1904. | R 7<br>L 6 | R 8<br>L 8 | R 1–3<br>L 1–3 | R 1–2<br>L 1–2 | 62 | 138 | 445mm | 105mm | E. L. Moseley. |
| 17. Univ. of Mich., Cat. No. 31614. | Sandusky, Erie Co., Ohio, May 28, 1904. | R 6<br>L 6 | R 8<br>L 8 | R 1–3<br>L 1–3 | R 1–2<br>L 1–2 | 60 | 136 | 465mm | 112mm | E. L. Moseley. |
| 18. Univ. of Mich., Cat. No. 31612. | Sandusky, Erie Co., Ohio, May 28, 1904. | R 7<br>L 7 | R 8<br>L 8 | R 1–3<br>L 1–3 | R 1–1<br>L 1–1 | 60 | 139 | | | E. L. Moseley. |
| 19. Univ. of Mich., Cat. No. 31627. | Brighton, Livingston Co., Mich., April 23, 1904. | R 7<br>L 6 | R 8<br>L 8 | R 1–3<br>L 1–3 | R 1–2<br>L 1–2 | 63 | 146 | | | B. K. Burgess. |
| 20. Univ. of Mich., Cat. No. 31628. | Brighton, Livingston Co., Mich., April 23, 1904. | R 7<br>L 7 | R 8<br>L 8 | R 1–3<br>L 1–4 | R 1–2<br>L 1–2 | 55 | 139 | | | B. K. Burgess. |

a view which is also held by Professor Cope ('92, p. 660) and Dr. Stejneger ('93, p. 214). This view is perhaps supported by the great variability of *leptocephala*, but *leptocephala* occurs in a distinct region while *butleri* occurs in the same region, in the same habitat and in almost equal abundance with typical forms of *E. s. sirtalis;* and at the same time its distinctive characters are so constant, that no variations have been found that can be regarded as transitional forms between the two species. The average number of gastrosteges in *butleri* is about 139 while in *sirtalis sirtalis* it is about 151. The temporals are also more constant than appears in the table; it is true that there is not always a single large temporal in the second row, but when there are two as in *sirtalis sirtalis*, the upper one, as far as we know is always much smaller than the lower one, which lies posterior and inferior to it. The form and coloration are, however, the most characteristic features. The body is more robust, the tail shorter, and the head smaller and more conical than in *sirtalis sirtalis.* As stated under variation, the color is remarkably constant for a member of this genus and while there is much color variation in the *E. sirtalis* group, I have never seen a variation that could be confused with *butleri.* Its striking coloration, robust form, small indistinct head and peculiar movements, make this snake very conspicuous and renders it almost impossible to confuse it with any other form. I have not seen enough specimens to determine its relationships with other groups, but the coloration, position of the lateral stripe, and reduced number of infralabials point strongly toward *E. radix* which meets it on the west.

Desirable as it is, therefore, to cut down the species in this genus, it must, I think, be concluded, from the specimens which have been collected that *Eutænia butleri* is a good species.

## SYNONYMY.

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1892. *Eutænia butlerii*, Cope, Proc. U. S. Nat. Mus., XIV., p. 651.

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1893. *Tropidonotus ordinatus*, var. *butleri*, Boulenger, Cat. Snakes Brit. Mus., I., p. 212.

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